16A and 16B. Therefore, applicants submit that the drawings do not require correction.

Claims 12-13 and 19-20 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. According to the Examiner, the limitation "the annulus bore" appearing in claims 12, 19 and 20 lacks sufficient antecedent basis. Claim 12 has been canceled and claims 13 and 19 have accordingly been amended to include a proper antecedent basis for the "annulus bore" limitation appearing in these claims and in claim 20, which depends from claim 19. Therefore, applicants submit that claims 13, 19 and 20 are patentable under 35 U.S.C., second paragraph.

Claims 1-3 stand rejected under 35 U.S.C. 102(b) as being anticipated by Pritchett et al. (U.S. Patent No. 5,868,204). These claims have been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

Claims 1-3, 10 and 12 stand rejected under 35 U.S.C. 102(b) as being anticipated by Hopper et al. (U.S. Patent No. 5,544,707). These claims have been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

Claims 1-3 and 10-11 stand rejected under 35 U.S.C. 102(e) as being anticipated by Millberger (U.S. Patent No. 6,050,339). These claims have been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

Claims 1-2, 4, 10 and 14 stand rejected under 35 U.S.C. 102(e) as being anticipated by Fenton (U.S. Patent No. 6,367,551). These claims have been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

Claims 5-9 stand rejected under 35 U.S.C. 103(a) as being obvious over Fenton as applied to claim 4, and further in view of Talafuse (U.S. Patent No. 4,405,014). These claims have been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

Claim 21 stands rejected under 35 U.S.C. 103(a) as being obvious over Fenton alone. This claim has been canceled and will be pursued in a continuation application. Therefore, the present rejection is now moot.

The Examiner has stated that claims 13, 19 and 20 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, second paragraph, and to include all of the limitations of their base and intervening claims. Claims 13 and 19 have been so amended. Claim 20 depends from claim 19 and therefore does not require amendment. Therefore, applicants submit that claims 13, 19 and 20 are allowable.

The Examiner has also stated that claims 15-18 would be allowable if rewritten in independent form to include the limitations of their base and intervening claims. Claims 15 and 17 have been so amended. Claims 16 and 18 depend on claims 15 and 17, respectively, and therefore do not require amendment. Therefore, applicants submit that claims 15-18 are allowable.

The prior art made of record but not relied upon has been considered but is not believed to be pertinent to the patentability of the present invention.

In light of the foregoing, claims 13 and 15-20 are submitted as allowable. Favorable action is solicited.

Respectfully submitted,

Date: August 3, 2002

Henry C. Query, Jr.
Reg. No. 35,650
(630) 260-8093

Specification Amendments:

The paragraph beginning on line 6 of page 19 has been amended as follows:

The controls bridge 20 shown in Figure 1 may be used in the flow completion system 10 to facilitate the connection of the service and control conduits 182 to their corresponding external service and control lines through the top of the tubing hanger 16. To this end the controls bridge 20, which is described more fully in applicants' co-pending U.S. Patent Application No. [[FMC Docket No. 66-12423]] 09/815,431, which is hereby incorporated by reference, includes a number of internal bridge lines and an actuating mechanism for remotely connecting each bridge line to both a service and control conduit in the tubing hanger and a corresponding external service and control line. Consequently, the need to make these connections individually or radially through the tubing spool 12 is eliminated. In addition, the controls bridge may include one or more closure members for controlling flow through respective bridge lines, thereby eliminating the need to include these closure members on the tubing spool 12 or in the tubing hanger 16. Additionally, the controls bridge 20 is preferably sufficiently lightweight to be installed and retrieved using an ROV.

The paragraph beginning on line 13 of page 20 has been amended as follows:

In accordance with a preferred embodiment of the invention, the first closure member 44 is preferably an internal gate valve which is similar to that disclosed in applicants' co-pending U.S. Patent Application No. [[FMC Docket No. 66-12273]] 09/815,436, which is hereby incorporated herein by reference. Referring to Figures 6 – 8, the gate valve 44 is unique in that substantially all of its operational components are housed entirely within the body 34 of the tubing hanger 16. In addition, the gate valve 44 is oriented generally axially so as to occupy a minimum of the radial cross sectional area of the tubing hanger 16. In order to most readily accommodate this vertical orientation of the gate valve 44, the annulus bore preferably includes a lateral branch which is connected to a longitudinal branch, and the gate valve is disposed across the lateral branch. For example, in Figures 7 and 8 the annulus bore 42 is shown to comprise an upper branch 184 which extends generally axially through the body 34 to the top of the tubing hanger 16, a lower branch 186 which extends generally axially through the body to the bottom of the tubing hanger, and an intermediate branch 188 which extends generally laterally between the upper and lower branches. To facilitate the formation of the annulus bore 42, the intermediate branch 188 is ideally machined into the outer wall 36 and then sealed by a plug member 190 or any other suitable means.

The paragraph beginning on line 18 of page 27 has been amended as follows:

As an alternative to the closure member 46, the flow completion system 10 may comprise a simple debris valve which is mounted in the top of the upper branch 184 to prevent debris from falling into the annulus bore when the tubing hanger running tool is removed from the tubing hanger but allow fluid to pass through the upper branch when the annulus bore is connected to an external conduit, such as an external service and control line. The construction and operation of the debris valve are explained more fully in applicants' co-pending U.S. Patent Application No. [[FMC Docket No. 66-12273]] 09/815,436.

The paragraph beginning on line 17 of page 30 has been amended as follows:

In order to provide an effective barrier between the well bore and the environment, the tubing hanger 16 preferably includes one of the aforementioned closure members to control the flow through each service and control conduit 182 that extends completely through the tubing hanger to other than a down hole valve. The closure member will therefore act as an initial barrier between the well bore and the environment through the service and control conduit. This barrier is in addition to the barrier which is provided by a conventional fluid coupling that is typically installed in the service and control conduit. As is known in the art, the conventional fluid coupling includes a poppet-type valve which will close when the coupling is disengaged from a corresponding coupling that is installed in a tubing hanger running tool, a controls bridge or a radial penetrator. As an

alternative to employing an individual closure member in each service and control conduit 182, the flow completion assembly 10 may comprise a multiport gate valve assembly to control the flow through a number of service and control conduits simultaneously. Such a gate valve assembly, which is shown as 318 in Figure 1, is described in applicants' co-pending U.S. Patent Application No. [[FMC Docket No. 66-12421]] 09/815,395, which is hereby incorporated herein by reference. With closure members such as the above in place in the service and control conduits 182, the tubing spool 16 will contain both of the industry required first and second barriers between the well bore and the environment.

The paragraph beginning on line 1 of page 33 has been amended as follows:

In addition, as shown schematically in Figure 14, one or more of the service and control conduits 182 which is connected to a radial penetrator coupling 424 may be routed within the body 34 of the tubing hanger 16 to a corresponding axial service and control conduit 182 that enters from the top of the tubing hanger. In this manner, a device with which a tubing hanger running tool communicates during installation of the tubing hanger 16, for example a surface controlled subsea safety valve ("SCSSV"), can be monitored during installation of the tubing hanger and then connected to an external service and control line through the radial penetrator once the running tool is disconnected from the tubing hanger. A conventional poppet-type fluid coupling may be installed in each vertical service and

control conduit 182 to seal the conduit once the running tool is disconnected. Alternatively, a fluid coupling 426 which comprising both a poppet valve and a gate valve may be employed in each such service and control conduit. Such a coupling, which is described more fully in applicants' co-pending U.S. Patent Application No. [[FMC Docket No. 66-12321]] 09/844,579, which is hereby incorporated herein by reference, will provide two barriers between the well bore and the environment through the service and control conduit.

Claim Amendments:

Claims 13, 15, 17 and 19 have been amended as follows:

13(Amended). [The flow completion system of claim 12, wherein the tree cap further comprises] A flow completion system for controlling the flow of fluid from a well bore, the flow completion system comprising:

a tubing spool which includes a central bore that extends axially therethrough and a production outlet which communicates with the central bore;

a tubing hanger which is supported in the central bore and which includes a production bore that extends axially therethrough and a production passageway that communicates between the production bore and the production outlet, the tubing hanger supporting a tubing string which extends into the well bore and defines a tubing annulus surrounding the tubing string;

a first closure member which is positioned in the production bore above the production passageway;

a first annular seal which is positioned between the tubing hanger and the central bore above the production passageway;

wherein the first closure member and the first seal comprise a first pressure-containing barrier between the well bore and a surrounding environment;

a second closure member which is positioned in the production bore above the first closure member;

a second annular seal which is positioned between the tubing hanger and the central bore above the first seal;

wherein the second closure member and the second seal comprise a second pressure-containing barrier between the well bore and the environment;

wherein both the first and the second barriers are associated with the tubing hanger; and

a tree cap which comprises:

an annular non-metallic body;

means for securing the body to the tubing hanger or the tubing spool;

an annulus seal stab for engaging an annulus bore which extends through the tubing hanger and communicates with the tubing annulus;

a fluid coupling which is mounted on the body and which is adapted to be connected to an external service and control line; and

a conduit which communicates between the fluid coupling and a bore in the annulus seal stab;

wherein fluid communication may be established between the annulus bore and the external service and control line through the annulus seal stab.

15(Amended). [The flow completion system of claim 10,] A flow completion system for controlling the flow of fluid from a well bore, the flow completion system comprising:

20

a tubing spool which includes a central bore that extends axially therethrough and a production outlet which communicates with the central bore;

a tubing hanger which is supported in the central bore and which includes a production bore that extends axially therethrough and a production passageway that communicates between the production bore and the production outlet, the tubing hanger supporting a tubing string which extends into the well bore and defines a tubing annulus surrounding the tubing string;

a first closure member which is positioned in the production bore above the production passageway;

a first annular seal which is positioned between the tubing hanger and the central bore above the production passageway;

wherein the first closure member and the first seal comprise a first pressure-containing barrier between the well bore and a surrounding environment;

a second closure member which is positioned in the production bore above the first closure member;

a second annular seal which is positioned between the tubing hanger and the central bore above the first seal;

wherein the second closure member and the second seal comprise a second pressure-containing barrier between the well bore and the environment;

wherein both the first and the second barriers are associated with the tubing hanger; and

a tree cap which comprises an annular non-metallic body and

means for securing the body to the tubing hanger or the tubing spool;

wherein the securing means comprises:

a plurality of collet fingers which are secured to the body;

a lock mandrel which includes a camming surface; and

a number of locking dogs which are disposed generally radially in the body and which each comprise a first end which is adapted to be engaged by the camming surface and a second end which is adapted to contact one or more of the collet fingers;

wherein actuation of the lock mandrel will force the locking dogs radially outwardly against the collet fingers to lock the collet fingers in a corresponding groove that is formed on the tubing hanger or the tubing spool.

17(Amended). [The flow completion system of claim 10, wherein the tree cap further comprises] A flow completion system for controlling the flow of fluid from a well bore, the flow completion system comprising:

a tubing spool which includes a central bore that extends axially therethrough and a production outlet which communicates with the central bore;

a tubing hanger which is supported in the central bore and which includes a production bore that extends axially therethrough and a production passageway that communicates between the production bore and the production outlet, the tubing hanger supporting a tubing string which extends into the well bore and defines a tubing annulus surrounding the tubing string;

a first closure member which is positioned in the production bore above the production passageway;

a first annular seal which is positioned between the tubing hanger and the central bore above the production passageway;

wherein the first closure member and the first seal comprise a first pressure-containing barrier between the well bore and a surrounding environment;

a second closure member which is positioned in the production bore above the first closure member;

a second annular seal which is positioned between the tubing hanger and the central bore above the first seal;

wherein the second closure member and the second seal comprise a second pressure-containing barrier between the well bore and the environment;

wherein both the first and the second barriers are associated with the tubing hanger; and

a tree cap which comprises:

an annular non-metallic body;

means for securing the body to the tubing hanger or the tubing spool;

a landing ring which is movably secured to the body; and

means for adjusting landing ring axially relative to the body;

wherein when the tree cap is secured to the tubing hanger or the tubing spool, the landing ring engages a tubing hanger locking mandrel which is slidably mounted on the tubing hanger;

whereby the landing ring maintains the position of the tubing hanger locking mandrel fixed relative to the tubing hanger.

19(Amended). [The flow completion system of claim 1, further comprising] A flow completion system for controlling the flow of fluid from a well bore, the flow completion system comprising:

a tubing spool which includes a central bore that extends axially therethrough and a production outlet which communicates with the central bore;

a tubing hanger which is supported in the central bore and which includes a production bore that extends axially therethrough and a production passageway that communicates between the production bore and the production outlet, the tubing hanger supporting a tubing string which extends into the well bore and defines a tubing annulus surrounding the tubing string;

a first closure member which is positioned in the production bore above the production passageway;

a first annular seal which is positioned between the tubing hanger and the central bore above the production passageway;

wherein the first closure member and the first seal comprise a first pressure-containing barrier between the well bore and a surrounding environment;

a second closure member which is positioned in the production bore above the first closure member;

a second annular seal which is positioned between the tubing hanger and the central bore above the first seal;

wherein the second closure member and the second seal comprise a second pressure-containing barrier between the well bore and the environment;

wherein both the first and the second barriers are associated with the tubing hanger;

a BOP which is removably connectable to the top of the tubing spool and which includes a BOP bore, a set of BOP rams, and at least one choke and kill line that communicates with a portion of the BOP bore which is located below the BOP rams; and

a tubing hanger running tool which is removably connectable to the top of the tubing hanger and which includes a cylindrical outer surface portion, a production port that communicates with the production bore, and an annulus port that comprises a first end which communicates with [the] an annulus bore that extends through the tubing hanger and communicates with the tubing annulus and a second end which communicates with the outer surface portion;

wherein the BOP rams are adapted to sealingly engage the outer surface portion above the second end of the annulus port;

whereby fluid communication between the tubing annulus and the BOP choke and kill line may be established through the annulus bore, the

annulus port and the portion of the BOP bore which is located below the first BOP rams.